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AUTHOR Dubin, Samuel S.
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ABSTRACT

Mid-career is a time period when the knowledge and skills acquired during a collegiate education begin to approach obsolescence unless constantly renewed. Several studies had reported that peak performance of engineers and scientists occurs in the thirties and early forties. If these observations are correct, the updating process must be viewed as criticially important during the mid-career period. An educational model is presented for keeping up-to-date. It consists of both motivational and work environment variables. The principal motivational no-treatment approach for understanding professional updating is by the use of expectancy theory. The environmental variables consist of: organizational climate, supervisory-subordinate relationships, the job itself; peer interaction and company policy. (Author)

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# UPDATING AND MID-CAREER DEVELOPMENT AND CHANGE

Samuel S. Dubin
The Pennsylvania State University

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The engineer who is "topped out," the manager who is declared surplus and laid off, the executive who is considered "deadwood" are examples of people at their mid-career who have not kept up-to-date with their professional requirements. The need to maintain professional competencies at mid-career has taken on a new significance within the past few years. For example, keeping up-to-date has become a legal requirement in medicine. Several states as Pennsylvania, New York. and Oregon now require physicians to take 60 hours a year of continuing education in order to renew their license. The American Board of Family Practice today requires recertification of their diplomates every six years.

## Half-life Concept

A useful measure for estimating the need for updating is the half-life concept. Dean Gordon S. Brown of Massachusetts Institute of Technology first used this concept to express the degree of obsolescence of knowledge: the half-life is defined as the period of time after completion of formal education when approximately half of what the professional has learned is no longer applicable.

Lukasiewicz (1971) has stated that the half-life of the 1940 engineering graduate was 12 years; in 1970 it had shrunk to five years. Rosenow (1971) of the American College of Physicians estimated in 1970 that the half-life of the medical internist's knowledge was five years. A recent report by

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Bromley (1972) of the National Academy of Science, indicated that the average half-life of a physics paper was eight years. Dubin (1972) estimated the half-life of knowledge of the psychologist to average 10-12 years. Chapanis (1971) reported that a compulsive well versed engineering psychologist would have to read 30 to 40 articles and reports a day merely to keep abreast of current literature. Dubin and George (1971) in a study of continuing education needs of natural resource managers and scientists estimated that 20 percent of the professional's working time should be devoted to updating.

## What Do We Mean by Updating?

By keeping up-to-date we mean maintaining competence in using concepts, theories, practices, and points of view in the individual's own field of specialization and in allied fields which bear on his organization's work. Also it includes knowing and understanding what others in the same field are working on, the problems they are trying to solve and what approaches to solutions they are taking.

## The Penn State Studies on Updating

In the past eight years we have carried out a series of the state and national surveys on the mid-career updating needs of various professional groups as engineers (Dubin and Marlow, 1965a), managers (Dubin, Alderman, and Marlow, 1968), natural resource managers and scientists (George and Dubin, 1971), and hospital personnel (1965). In addition to providing data on their professional characteristics, education, primary responsibilities, employment, and so on, the respondents were asked to give information regarding

their attitudes toward the need for updating, the factors that motivate them to keep abreast of new developments, their perception of the supervisor's attitude toward further education and training, the methods they use and the methods they prefer for keeping up-to-date, and the attitudes and practices of their organizations in this respect. Each professional group was provided with a list of some fifty to sixty areas of knowledge specific to their own field and asked to indicate the degree of their personal needs in each subject area, as well as to indicate whether they felt such knowledge was needed by their subordinates and by their immediate supervisors. In addition, each respondent was given the opportunity to write in the specific courses he would like to include in personal self-development program.

Each of these studies indicated that professionals in mid-career need updating but varying factors interfered with the attainment of this goal as: do not have the time, job does not demand more education, family priorities, too far to drive to a school, no rewards for getting an additional degree, etc.

Reasons for Updating at Mid-career

The factor which figures most prominently in updating is the rate of change in the discovery and application of new knowledge. Professional people, now trained in their specialties, are finding their knowledge and methods out of date after only five to ten years on the job. Not only does one have to keep abreast of his own areas, but also what is coming on in related fields. In addition to the rate of change in the discovery of new

knowledge, other reasons can be cited for updating. Personal and company objectives can change with the result that new competencies are required. Organizational practices such as specialization on one's job can inhibit professional growth. A person's motivation can change as he grows older. If the organizational climate and reward are insufficient, this may inhibit the updating process. Also changes in national priorities can modify federal spending policies. A key example is the loss of engineering jobs in the aerospace industry with the resultant retraining needed by many engineers.

Evidence of the Need for Updating at Mid-career

Dalton and Thompson (1971) in a study of 2,500 R & D engineers concluded that the highest period of job performance occurs in the early and late thirties.

They developed a curve based on performance ratings of supervisors, the criterion being the engineer's contribution to the company during the past year. Their finding suggests that the performance of engineers peaks early in one's career--in the early and late thirties, and then declines with age. This suggests that the years of high performance are starting and ending sooner and that there is a definite trend toward early obsolescence. A study by Pelz and Andrews (1966) ten years ago showed that productivity and usefulness in engineers peaked in the late forties.

Another approach to measure the erosion of knowledge over time was done by Zelikoff (1969). He analyzed catalogue course offerings for five engineering colleges from 1935-1965 at five year intervals. By identifying courses that were dropped and added, he developed erosion curves in five areas of engineering (electrical, chemical, etc.) as measured by the number of course

additions and deletions. He concluded that for electrical engineering only five percent of the information of the 1935 class was applicable in 1965; for the 1960 graduates it was about 60 percent.

## The Updating Process

The updating model which I am proposing (Dubin, 1972a, 1972b) is multi-dimensional and consists of both psychological and organizational environment variables. The psychological variables are primarily concerned with motivation. The environmental variables consist of: an organizational climate that supports updating; supervisory behavior that encourages professional growth; challenging assignments that provide meaningful work; peer interaction that encourages and allows for the interchange of information; and a company policy that rewards updating. I want to touch on each point briefly.

## Motivation

Employee motivation is a topic of considerable interest to organizations. Porter (1971) has advanced a theoretical position for understanding motivation in professional updating using expectancy theory. The model attempts to integrate concepts of motivation, effort, job performance, ability, satisfaction, attitudes, and the rewards of work. A major assumption of expectancy theory is that the motivation force of an individual is a function of (1) his expectation that certain outcomes will result from his behavior and (2) valence, the desirability or strength of these outcomes. The decision by a person to work on a particular task and expend a certain amount of effort is a function of his personal probability that he can accomplish the task and his personal estimate that accomplishing the task goals will be followed by certain outcomes.

How the professional evaluates different kinds of potential rewards is significant. Rewards can be intrinsic: a feeling of accomplishment, self fulfillment, etc., or extrinsic: a pay increase, promotion, favorable evaluation, etc. An organization can influence the employee's expectations by its rewards for keeping abreast of current knowledge.

Another approach to motivation is through McClelland's (1969) achievement motivation. By definition, achievement refers to competition with a standard of excellence. Persons who are highly motivated are generally attracted to activities that require skill and excellence in performance. McClelland has carried out a number of studies in which he successfully taught achievement motivation to entrepreneurs.

Organizational Climate

The major environmental factor in updating is organizational climate. It can be defined as organizational and management practices that influence motivation, condition attitudes, and shape behavior on the part of its members. Organizational climate factors will vary with each company. As an illustration, (Figure 5) Campbell and Dunnette (1968) have identified a high organizational climate as having some of the following characteristics:

Achievement--a desire of the group to do a good job and contribute to the performance of the company;

Concern for excellence--degree to which the group is concerned with improving individual performance, being flexible, innovative and competent;

Problem solving emphasis--extent to which the group anticipates and solves problems related to group functioning;

Reputation--organization reflects status and reputation of individual's work group as compared to other work groups;

Training opportunities--degree to which organization provides training for individuals;

Atmosphere--degree to which supervisors generate a supportive and friendly atmosphere;

Initial job orientation--individual's are informed of what to expect when they first start on the job.

Supervisory Behavior

The relationship between supervisor and subordinate is crucial in updating. Our studies on engineers and managers indicate consistently that supervisors are not developing their subordinates' professional growth. In a recent study (Dubin and Marlow, 1965) we found that 64 percent of 2,000 engineers reported that their supervisors took a noncommittal attitude towards their education and development. Similarly, 51 percent of 3,600 industrial managers and 42 percent of natural resource managers reported that their superiors are noncommittal about their further training (Dubin et al., 1967). Corroboration of these findings was reported (Renck et al., 1969) in a National Science Foundation Study: about a third of the scientists and just under half the engineers report attitudes of noninterest on the part of their supervisors in their professional development.

Landis (1969), in an industrial study of engineers asked, "How does your immediate supervisor feel about further job-directed education or training?" Fifteen percent reported "very encouraging," 47 percent, "somewhat encouraging," and 37 percent, "not encouraging at all." He concluded that it is "the immediate supervisor that counts in the development of subordinates. If a boss does not encourage a man, he will not take

further course work . . . unless the supervisor is willing to encourage and accommodate his men in spite of the possible interference with his work schedule, few men will undertake continuing studies."

Challenging Jobs

Another important variable is on-the-job learning. Margulies and Raia (1967) asked R & D scientists and engineers: "What was the most fruitful learning experience you have had over the past year or two?" The most frequent response (42 percent) was on-the-job problem solving. This was described as being assigned to "interesting tasks," "broadening projects" and "writing proposals which force me to dip into the literature and become current on everything connected with the project." When on-the-job activities include challenging assignments, the exploration of new tasks enables the scientist and engineer to assess his own knowledge and fill in gaps and deficiencies.

Challenging jobs provide learning experiences that can be exciting, interesting, and meaningful. They provide the success experiences that play an important role in motivating the individuals to keep up-to-date and grow continuously. Responsibility, job involvement, and challenging work assignments all contribute to the first steps in continuing education--awareness of needs and individual motivation.

Colleague Interactions

An organizational environment that is stimulating provides opportunities for peers to interact. This promotes learning, innovation, and the development of ideas. Such experiences come from interchange with colleagues,

discussion with managers and experts, talking with colleagues and other disciplines, or participating on panels and committees.

Methods of keeping abreast of new knowledge varies somewhat by professions. Rosenbloom (1970) conducted an interesting study on the flow of technical information in engineering and scientific groups in industrial laboratories. He was studying technology transfer, or how new knowledge that originates in one place gets communicated and used in another place. He found that most information that engineers in industrial laboratories acquire comes to them by word of mouth from colleagues and local sources. Research scientists rely more heavily on journal literature (Renck, 1969).

Management Philosophy

Finally, a company should have a written policy that requires updating for its employees. Many companies have educational assistance funds that reimburse employees who complete education courses, but few companies make continuous updating mandatory. In our study of engineers, (Dubin and Marlow, 1965) 79 percent reported that their companies had educational assistance programs, but three-fourths of the engineers reported that this availability had no effect in motivating them to undertake additional work. Similarly, half of middle managers (Dubin et al., 1966) said that company policy on financial aid had little effect on their decision to undertake further education. Evidence derived from these studies indicated that taking additional course work was not sufficiently rewarded in industry and was not a requirement for promotion or salary increases. The availability of financial assistance for self-improvement is obviously not a sufficient incentive for updating.

Summary

Keeping up-to-date is not a simple process of reading a few journals or going to a professional meeting once a year. Since the cycle of scientific and technological output is becoming increasingly shorter, obsolescence is very likely to appear at mid-career. The updating model described points out that motivational and organizational inputs can help keep professionals up-to-date. All of this points in the direction of a continuous lifelong learning requirement, and that self and professional assessments need to be carried out at various stages of one's career. One of the more promising developments to assist in the updating process is the greater utilization of motivational and organizational practices to redesign jobs.

REFERENCES

Bromley, D. A. Physics in perspective. National Academy of Sciences News Report, 1972.

Chapanis, A. Prelude to 2001: Exploration in communications. American Psychologist, 1971, 26, 949-961.

Campbell, J. P., & Dunnette, M. G. Laboratory education: Impact on people and organizations. Industrial Relations, October 1968, 8(1), 1-45.

Dalton, G. W., & Thompson, P. H. Accelerating obsolescence of older engineers. Harvard Business Review, 1971, 49, 57-67.

Dubin, S. S. (Ed.) Professional Obsolescence. Lexington, Mass.: Lexington Books, D. C. Heath, 1972. (a)

Dubin, S. S. Obsolescence or lifelong education: A choice for the professional. American Psychologist, 27(5), May 1972. (b)

Dubin, S. S., & George, J. L. Continuing education needs of natural resource managers and scientists. University Park: Department of Planning Studies, Continuing Education, Pennsylvania State University, 1972.

Dubin, S. S., & Marlow, H. L. A survey of continuing professional education for engineers in Pennsylvania. University Park: Department of Planning Studies, Continuing Education, Pennsylvania State University, 1965. (a)

Dubin, S. S., & Marlow, H. L. The determination and measurement of supervisory training needs of hospital personnel. University Park: Department of Planning Studies, Continuing Education, Pennsylvania State University, 1965. (b)

Dubin, S. S., Alderman, E., & Marlow, H. L. Managerial and supervisory educational needs of business and industry in Pennsylvania. University Park: Department of Planning Studies, Continuing Education, Pennsylvania State University, 1967.

Landis, F. Continuing engineering education--who really needs it? Paper presented at Continuing Education Studies meeting, American Society of Engineering Education, Pittsburgh, Pa., Nov. 5-9, 1969.

Lukasiewicz, J. The dynamics of science and engineering education. Engineering Education, 1971, 61, 880-882.

Margulies, N., & Raia, A. P. Scientists, engineers, and technological obsolescence. California Management Review, Winter 1967, 10(2), 43-48.

McClelland, D., & Winters, D. Motivating Economic Achievement. New York: The Free Press, 1969.

Pelz, D., & Andrews, F. M. Scientists in organizations: Productive climate for research and development. New York: John Wiley & Sons, Inc., 1966.

Porter, L. W. A motivational theory for updating. In S. S. Dubin (Chm.), Motivation for professional updating. Symposium presented at the XVII International Congress of Applied Psychology. Liege, Belgium, July, 1971.

Rosenbloom, R. S. Technology of Information Transfer, Boston: Harvard University, 1970.

Rosenow, E. C., Jr. Medical knowledge self-assessment programs. Paper presented at 173rd Annual Meeting of the Medical and Chirurgical Faculty of State of Maryland, Baltimore, April 14, 1971.

Zelikoff, S. B. On the obsolescence and retraining of engineering personnel. Training and Development Journal, May 1969, 23, 3-15.